

DETAILED ACTION

Election/Restrictions

1. This application contains claims 14-16, 22-24, 28-30 drawn to an invention nonelected with traverse in the reply filed on 01/05/2005. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 8-13, 21, 25-27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsman et al. (hereinafter Kinsman, US 2002/0027257, applicants cited).

Kinsman discloses a integrated circuit device (fig. 1f) , comprising a die (page 3, [0023]) having an active surface 14 (fig. 1f), a plurality of solder bumps 20/32 (fig.1f) formed on the active surface 14 of said die such that base junctions between the solder bumps 20/32 and their associated surfaces of formation define first wetting angles; and a single support coating 30 (fig.1f) formed on said active surface of said die wherein said support coating 30 has been fully cured (page 3, [0026], lines 21-30) prior to any reflow of any of said plurality of solder bumps 20/32 (fig. 1f), and the resulting mid-level wetting angles remain sufficiently high such that the mid-level junctions do not become the primary location for solder joint failure. Note that the solder bumps are at least spherical in portion 32,(fig. 1e and page 4, [0029]) and that the bumps are formed from a single homogenous material (page 3, [0023]; note that element 20 is made of conductive-filled epoxy and element 32 is also made of conductive-filled epoxy material (page 4, [0027]) However, Kinsman does not explicitly teach that the height of the support coating 30 is about 20-70 percent of the pre-reflow height of the solder bumps 20/32, and the resulting first wetting angles are at least approximately 40-50 degrees . Nevertheless, as to claims 8, 10-11, 13, 21, 25-27 and 32, it would have been obvious to one of ordinary skills in the art at the time the invention was made to modify the invention of Kinsman with specific ranges for the support coating's height relative to the bumps so as to result in the first wetting angles being at least 40-50 degrees, since it is a prima facie obvious to an artisan for optimization and experimentation to create specific ranges for the support coating height so as to obtain the resulting wetting angle of at least 40 degrees because applicant has not yet established any criticality for the specific angle.

Normally, it is to be expected that a change in temperature, or in thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such

Art Unit: 2814

ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 19553).

As to claim 9, the support coating 30 (fig. 1f) is formed from an epoxy based material (page 3, [0026], lines 25-29)

As to claim 12, the support coating 30 (fig. 1f) is applied over the active surface 14 and the underlying pads 12 (fig. 1f).

Response to Arguments

4. Applicant's arguments filed 07/10/2007 have been fully considered but they are not persuasive.

In the remarks, applicants argue that the rejection of claims 8-13, 21, 25-27, 32 under 35 USC 103(a) is traversed because Kinsman does not disclose the newly amended claims. In particular, applicants argue that Kinsman's bumps are not spherical and that they are not made of a homogenous material. The examiner notes that at least a portion bump 32 is spherical (fig 2 and page 4, [0029]). In addition, the bumps are made of a single material (note that Kinsman teaches the external solder 32 and the internal solder 20 are made of the same material for compatibility (page 3, [0023] and page 4, [0027]) such as conductive-filled epoxy material. Furthermore, applicants argue that the range for the height between the support coating relative to the solder bump and the wetting angle are distinguished over the cited art. The examiner disagrees because applicants have not show any unexpected result or advantage over the cited art's disclosure. Note that the courts have concluded that a change in dimension, degree, size, shape, etc. without special functional significance is not patentable. Research Corp. v. Nasco

Industries, Inc., 501 F2d 358; 182 USPQ 449 (CA 7), cert. denied 184 USPQ 193; *USLW* 3359 (1974), *In re Rose*, 105 USPQ 137, and *In re Aller et al.*, 105 USPQ 233.

For the foregoing reason, the examiner maintains the rejection.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for

Art Unit: 2814

published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/(Vikki) Hoa B Trinh/

Examiner, Art Unit 2814

/Howard Weiss/

Primary Examiner

Art Unit 2814